



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Interstate Seed Company

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SUNFLOWER

'IS 2168'



In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington this 30th day of July in the year of our Lord one thousand nine hundred and eighty-one.

Attest

[Signature]

Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

[Signature]
Secretary of Agriculture

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: See Reverse.

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY IS 2168		1b. VARIETY NAME IS 2168		FOR OFFICIAL USE ONLY PV NUMBER 8100025	
2. KIND NAME Sunflower		3. GENUS AND SPECIES NAME Helianthus annuus		FILING DATE 11/18/80	TIME 11:00 A.M. P.M.
4. FAMILY NAME (BOTANICAL) Compositae		5. DATE OF DETERMINATION January 1980		FEE RECEIVED \$ 500.00 \$ 250.00	DATE 11/18/80 7/6/81
6. NAME OF APPLICANT(S) Interstate Seed Company		7. ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) P O Box 470, Fargo, North Dakota 58107		8. TELEPHONE AREA CODE AND NUMBER 701-235-4431	
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (Corporation, partnership, association, etc.) Corporation			10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION North Dakota November 1917		11. DATE OF INCORPORATION November 1917

12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS:

CREAM DR. 12/22/80 *SGM*
Stan Rollin, Seed Consultant, 6802, Laurel, MD 20810

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- ☒ 13A. Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)
- ☒ 13B. Exhibit B, Novelty Statement.
- ☒ 13C. Exhibit C, Objective Description of the Variety (Request form from Plant Variety Protection Office.)
- ☒ 13D. Exhibit D, Additional Description of the Variety.

14a. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a). (If "Yes," answer 14B and 14C below.) ☐ YES ☒ NO

14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES ☒ NO

14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED? ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? ☐ YES ☒ NO (If "Yes," give name of countries and dates.)

15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? ☐ YES ☒ NO (If "Yes," give name of countries and dates.)

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? ☒ YES ☐ NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

11-12-80
(DATE)

Mounir Abdelhak
(SIGNATURE OF APPLICANT)

(DATE)

(SIGNATURE OF APPLICANT)

INSTRUCTIONS

GENERAL: Send an original copy of the application and exhibits, at least 2,500 viable seeds, and \$500 fee (\$250 filing fee and \$250 examination fee) to U.S. Dept. of Agriculture, Agricultural Marketing Service, Livestock, Poultry, Grain and Seed Division, Plant Variety Protection Office, National Agricultural Library Building, Beltsville, Maryland 20705. (See section 180.175 of the Regulations and Rules of Practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

ITEM

- 5 Give the date the applicant determined that he had a new variety based on (1) the definition in section 41(a) of the Act and (2) the date a decision was made to increase the seed.
- 13a Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability.
- 13b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.
- 13c Fill in the Exhibit C, Objective Description form, for all characteristics for which you have adequate data.
- 13d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe, such as, plant habit, plant color, disease resistance, etc.
- 14a If "YES" is specified (seed of this variety be sold by variety name only as a class of certified seed) the applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled, his decision published, or the certificate has been issued. However, if the applicant specified "NO," he may change his choice. (See section 180.16 of the Regulations and Rules of Practice.)
- 15a See section 42 of the Plant Variety Protection Act and section 180.7 of the Regulations and Rules of Practice.

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Interstate Seed Co., Fargo, N.Dak.
Appl. No. 8100025
Sunflower inbred line IS2168

13-a. Exhibit A.

1. Origin and breeding history:

IS2168 is a normal cytoplasm line. The line and its cytoplasmic male sterile counterpart IS1168 are selections from HA290 and Cms HA290. The latter lines were released in 1975 by the Agricultural Experiment Stations of North Dakota State University, Fargo, North Dakota, the Texas Agricultural Experiment Station, College Station, Texas, and the United States Department of Agriculture, Agricultural Research Service (Enclosed is a copy of the original release).

2. Breeding methods used to develop IS2168 and its counterpart IS1168:

Selections from HA290 and Cms HA290 started in our disease nursery when it appeared to be heterogenous for rust resistance. Plant reaction to rust infection was classified into three classes, highly resistant, moderately resistant, and highly susceptible. Plants from the previous highly resistant class of HA290 were selected and backcrossed to Cms HA290. Seedlings from selected plants were tested in the greenhouse for resistance to the sunflower rust race 1. Homozygous resistant families of both normal and sterile lines were again tested in the disease nursery and an additional backcross was made. Two additional backcrosses were made and a progeny test for rust race 1 was continued to ensure the homogeneity for rust resistance. Seed from the fourth generation selection from HA290 and the fourth backcross to Cms HA290 were used to increase the breeder seed of IS2168 and IS1168.

3. Stability and Variants:

During our seed increase program IS2168 appears to be stable and uniform. Pollen shedder variants appear approximately 1:5000 in populations of the cytoplasmic male sterile IS1168 (see following table). The low percentage of variants indicates good stability of maintenance of sterility by IS2168. IS2168 will be used as a maintainer for sterility of IS1168 and other inbred lines used for the production of sterile single crosses.

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13-a

Table 3. Percentage of pollen shedder
variants in sunflower inbred line IS1168.

Year and Locations	# plants observed*	# shedders	% shedders
1979, Homestead, FL	14,000	8	0.057
1980 Gerber, CA	262,500	53	0.02
1980 Gonvik, MN	225,000	39	0.017

- * Total No. of plants observed was based on the plant population per acre X acre of production of IS1168 ie.
- a. Homestead one acre at 14,000 plants / acre
 - b. Gerber 18.75 acres at 14,000 plants / acre
 - c. Gonvik 18.75 acres at 12,000 plants / acre

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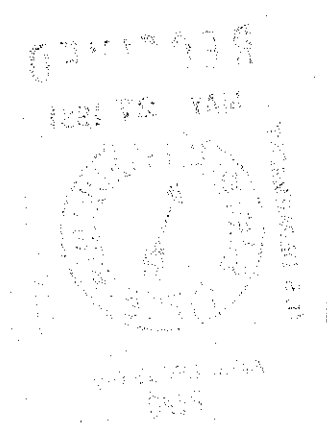
2. IS1168 has shown an extremely low percentage of pollen shedder variants (from 0.017 to 0.057%) in comparison to Cms HA290 which we have used in hybrid seed production since 1975 and has shown to contain from 5 to 11% pollen shedder variants. These variants in Cms HA290 are contributed to the genetic impurity of HA290, the maintainer line for Cms HA290. The frequency of fertility restoration genes in HA290 makes it impractical for sterility maintenance of Cms HA290 or even to be used with other lines for the production of sterile single crosses.

SUNFLOWER INBRED LINE IS 2168

13B Exhibit B: Novelty Statement

IS 2168 is most similar to HA 290; however, the seeds of IS 2168 are (4) Black with narrow dark grey striping and HA 290 is a mixture of (3) Broad black and narrow white striping and (4) Black with narrow dark grey striping; a comparison of other characters which differ is as follows:

<u>IS 2168</u>	<u>CHARACTER</u>	<u>HA290</u>
110 mm.	Length	95 mm.
77 Gms	100 seeds	56 gms.
21.70	Protein %	29.40
42.40	Oil %	32.40
127	Iodine	129
30.9	Oleic Acid %	24.4
60.2	Linoleic Acid %	65.5



U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(SUNFLOWER)

OBJECTIVE DESCRIPTION OF VARIETY
SUNFLOWER (*HELIANTHUS ANNUUS*)

NAME OF APPLICANT(S) Interstate Seed Company	VARIETY NAME OR TEMPORARY DESIGNATION IS 2168 Inbred Line
ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code) 417 Main PO 470, Fargo, North Dakota 58107	FOR OFFICIAL USE ONLY PVPO NUMBER 8100025

Place numbers in the boxes (e.g.) for the characters that best describe typical plants of this variety. The symbol ▲ indicates decimal.

COMPARISON VARIETIES

NON-OIL: 1 = ARROWHEAD 2 = MINGREN 3 = SUNDAK HA 290 Inbred Line
OIL: 4 = PEREDOVIK 5 = KRASNODARETS 6 = OTHER

1. CLASS:

1 = OIL TYPE 2 = NON-OIL TYPE (confectionery)

2. MATURITY:

<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="4"/> NO. OF DAYS TO HEAD FIRST VISIBLE (from emergence)	<input type="text" value="1"/> <input type="text" value="0"/> <input type="text" value="4"/> NO. OF DAYS TO HARVEST RIPENESS (from emergence)
<input type="text"/> <input type="text"/> DAYS EARLIER THAN <input type="text"/>	<input type="text"/> <input type="text"/> DAYS EARLIER THAN <input type="text"/>
HEADING SAME AS <input type="text"/>	MATURITY SAME AS <input type="text"/>
<input type="text" value="0"/> <input type="text" value="1"/> DAYS LATER THAN <input type="text" value="6"/>	<input type="text" value="0"/> <input type="text" value="1"/> DAYS LATER THAN <input type="text" value="6"/>

3. HEIGHT:

<input type="text" value="1"/> <input type="text" value="2"/> <input type="text" value="5"/> cm TALL AT HARVEST RIPENESS	<input type="text" value="0"/> <input type="text" value="1"/> <input type="text" value="0"/> cm SHORTER THAN <input type="text" value="6"/>
	SAME AS <input type="text"/>
	<input type="text"/> <input type="text"/> <input type="text"/> cm TALLER THAN <input type="text"/>

4. STEM:

<input type="text" value="0"/> <input type="text" value="1"/> <input type="text" value="6"/> LENGTH OF INTERNODE AT HARVEST RIPENESS	<input type="text" value="1"/> <input type="text" value="5"/> NUMBER OF LEAVES
<input type="text"/> <input type="text"/> <input type="text"/> CM. SHORTER THAN <input type="text"/>	<input type="text"/> <input type="text"/> FEWER LEAVES THAN <input type="text"/>
SAME AS <input type="text" value="6"/>	SAME AS <input type="text" value="6"/>
<input type="text"/> <input type="text"/> <input type="text"/> CM. LONGER THAN <input type="text"/>	<input type="text"/> <input type="text"/> MORE LEAVES THAN <input type="text"/>

BRANCHING: 1 = NO BRANCHING 2 = BASAL BRANCHING
3 = TOP BRANCHING (with central head) 4 = FULLY BRANCHED (without central head)

COLOR OF GROWING POINT: 1 = GREEN 2 = YELLOW

5. LEAVES (Midstem at flowering):

2 3 0

CM. BLADE LENGTH

2 2 0

CM. BLADE WIDTH



CM. SHORTER THAN



LENGTH SAME AS

6

COMPARISON
VARIETY

CM. NARROWER THAN



WIDTH SAME AS

6

COMPARISON
VARIETY

CM. LONGER THAN



CM. WIDER THAN



1

WIDTH: LENGTH RATIO: 1 = NARROWER THAN LONG 2 = EQUAL 3 = WIDER THAN LONG

1

LEAF SHAPE: 1 = CORDATE 2 = OTHER _____

1

LEAF APEX: 1 = ACUMINATE 2 = OTHER _____

1

LEAF BASE: 1 = AURICULATE 2 = TRUNCATE

3

LEAF MARGIN: 1 = ENTIRE 2 = FINELY CRENATE 3 = COARSELY CRENATE 4 = OTHER _____

1

DEPTH OF MARGIN INDENTATIONS: 1 = SHALLOW 2 = INTERMEDIATE 3 = DEEP

2

ATTITUDE: 1 = ERECT 2 = ASCENDING 3 = HORIZONTAL 4 = DESCENDING

2

SURFACE: 1 = SMOOTH 2 = CRINKLED (*ridged*) 3 = OTHER _____

2

COLOR: 1 = LIGHT GREEN 2 = GREEN 3 = DARK GREEN 4 = BROWN

1

MARGIN COLOR: 1 = GREEN 2 = YELLOW

6. HEAD AT FLOWERING:

2

RAY FLOWERS: 1 = ABSENT 2 = PRESENT

1

RAY FLOWER COLOR: 1 = YELLOW 2 = SULFUR YELLOW 3 = ORANGE YELLOW 4 = OTHER _____

1

DISK FLOWER COLOR: 1 = YELLOW 2 = RED 3 = PURPLE

2

ANTHOCYANIN IN STIGMAS: 1 = ABSENT 2 = PRESENT

2

POLLEN COLOR: 1 = WHITE (*colorless*) 2 = YELLOW

1

PAPPI: 1 = GREEN 2 = RUST (*red*)

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4 9 0

MM. RAY LENGTH

1 3 0

MM. RAY WIDTH



MM. SHORTER THAN



SAME AS

6

COMPARISON
VARIETY

MM. NARROWER THAN



SAME AS

6

COMPARISON
VARIETY

MM. LONGER THAN



MM. WIDER THAN



7. HEAD AT SEED MATURITY:

 CM. DIAMETER CM. NARROWER THAN

SAME AS

 CM. WIDER THAN RECEPTACLE SHAPE: 1 = FLAT 2 = CONVEX 3 = CONCAVE HEAD ATTITUDE: 1 = VERTICAL (*erect*) 2 = ASCENDING 3 = HORIZONTAL 4 = DESCENDING NO. OF SEEDS PER HEAD SEEDS / HEAD LESS THAN

SEEDS / HEAD SAME AS

 SEEDS / HEAD MORE THAN

COMPARISON VARIETY

COMPARISON VARIETY

8. SEEDS:

 OUTER PERICARP: 1 = CLEAR 2 = STRIPED BLACK 3 = NEARLY SOLID BLACK MIDDLE PERICARP: 1 = WHITE 2 = SOLID PURPLE INNER PERICARP (*seed coat*): 1 = NO COLOR 2 = BROWNISH BLACK STRIPES: 1 = ABSENT 2 = EVEN BLACK & WHITE STRIPES 3 = BROAD BLACK & NARROW WHITE

4 = BLACK WITH NARROW DARK-GREY STRIPING 5 = OTHER _____

 MOTTLING: 1 = ABSENT 2 = PRESENT SHAPE: 1 = OVATE 2 = OBOVATE (*shield*) 3 = NARROWLY OBOVATE 4 = OBLONG 5 = ELLIPTIC SHAPE (*cross-section*): 1 = NOT CURVED 2 = CURVED MM. LENGTH GM. / 100 SEED MM. SHORTER THAN

SAME AS

 MM. LONGER THAN % HELD ON 7.9 MM. (20/64) ROUND-HOLE SCREEN % LESS THAN

SAME AS

 % MORE THAN

COMPARISON VARIETY

 GM. LIGHTER THAN

SAME AS

 GM. HEAVIER THAN

COMPARISON VARIETY

COMPARISON VARIETY

9. DISEASE AND INSECTS (0 = Not tested, 1 = Susceptible, 2 = Resistant):

☒ 2 RUST (*Puccinia helianthi*)GIVE RACES: Race 1☒ 2 VERTICILLIUM WILT (*Verticillium dahliae*)☒ 1 DOWNY MILDEW (*Plasmopara halstedii*)☐ 0 WHITE BLISTER RUST (*Albugo tragopogi*)☐ 0 BROOM RAPE (*Orobanche cannis*)

GIVE RACES: _____

☐ 0 EUROPEAN SUNFLOWER MOTH (*H. nebullela*)☐ OTHER (specify) _____☒ 1 SCLEROTINIA WILT (*Sclerotinia sclerotiorum*)☒ 2 LEAF MOTTLE (*V. albo-atrum*)☒ 1 GRAY-MOLD BLIGHT, BUD ROT (*Botrytis cinerea*)☒ 2 CHARCOAL ROT, STEM ROT (*Macrophomina phaseolina*)☒ 1 SUNFLOWER MOTH, N. AMERICAN HEAD MOTH
(*Homoeosoma electellum*)☐ OTHER (specify) _____☐ OTHER (specify) _____10. GIVE VARIETY OR VARIETIES THAT MOST CLOSELY RESEMBLE THE SUBMITTED VARIETY. For the following characteristics indicate degree of resemblance by placing in the column marked, D.R., one of the following numbers:
1 = Submitted variety is less, lighter or inferior than comparison variety 2 = Same as 3 = More than, darker, or superior

CHARACTER	VARIETY	D.R.	CHARACTER	VARIETY	D.R.
Frost resistance	6	2	Leaf attitude	6	2
Lodging resistance	6	2	Head attitude	6	2
Neck or stem strength	6	2	Ray flower color	6	2
Branching type	6	2	Seed shape	6	2
Petiole length	6	2	Seed color	6	2
Leaf shape	6	2	Seed striping pattern	6	2
Leaf color (green)	6	2	Seed yield	6	2

11. GIVE THE FOLLOWING DATA FOR SUBMITTED AND A SIMILAR VARIETY*.

VARIETY	HULL (%)	PROTEIN (%)	OIL (%)	IODINE NO.	FATTY ACIDS	
					OLEIC (%)	LINOLEIC (%)
Submitted		21.70	42.40	#-127	30.9	60.2
Similar		29.40	32.40	#-129	24.4	65.5
Name of similar variety	HA 290					

* Hull, protein and oil percentages expressed for whole undecorticated seed; acids expressed as percentages of oil

12. COMMENTS:

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ADDITIONAL DESCRIPTION

13 D Exhibit D:

Comparison of oil content of IS 2168 and HA 290 has shown IS 2168 to be higher by as much as ten percent (10%). (See attached.)

Although seed size is highly influenced by environment, production of both IS 2168 and HA 290 under similar circumstances has shown that IS 2168 is generally larger seed. A representative production sample of each line showed IS 2168 to have sixty percent (60%) of the seed passing over a 12/64" round hole screen while HA 290 had only 43.1% passing over a 12/64" round hole screen.